

Stemming Design Aspects to Model Intelligent Home Security Alert System Using Object Recognition

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Abstract: Human brains are capable to produce novel solutions to the dynamically emerging security problems. But they are restricted with process automation, correctness, remembrance, knowledge representations, processing parallel task, increasing execution speed, mobile control and dealing with huge amount of data when compared to intelligent computational tools. In this proposed effort, various design aspects are framed that serves as a boundary to build an intelligent home security model with alarm signal to denote the unauthorized entry of an object. This model uses the advantage of artificial intelligent technique to attain high level home security system incorporated with traditional monitoring system.

Keywords: Artificial Intelligence, Object Recognition, Security, Authorization

I. INTRODUCTION

In this modern world, the need emerges to design an automated intelligent system to track the home crime. The ways to attempt a crime is unpredictable but it is possible to design a model based on the formulated and suggested aspects. The model can adopt wireless technology integrated with the electrical components in a house, message generator and alarm generator to protect home from burglar [1].

Embedded system provides effective implementation of the internal process involved in the security system by using

required sensors to track the defined process [2]. The web camera can be used to track the movement of any object and generation of text messages to alert the admin to take appropriate actions [3]. The formulation of security measures using the advanced technology with low cost can only prevent theft and control unwanted happenings [4].

Unauthorized access can be monitored by residing in remote location. The illegal access to the home can be prevented by triggering precautionary actions if non –correlated events occurs [5].

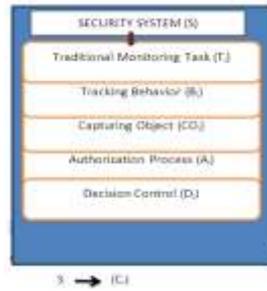
Due to the day to day demand, the dynamic decisions are constructed through continuous learning of the environment. Artificial intelligence technique provides knowledge-based control system to protect the home from illegal task. Mobile applications are the efficient way to have flexible control and monitoring the essential security task.

The security systems can be possible to implement the integral task of software and hardware that are economically feasible to guard the home from unsanctioned events [6]-[7]. Person re-identification methods are suitable to ensure the authorized entry. The challenges are solved by the advanced technologies to ensure the valid object behavior. The communication messages are transmitted to the owner when abnormal tasks execute [8][9]. Image Processing practices are considered as a core research area within engineering and computing disciplines [10][11].

II. PROPOSED METHODOLOGY

2.1. Strategies in System Deployment:

Let S be the security model that integrates with various internal components (C_i) to attain the objective.



The performance (ρ) of the model S purely depends on the functionality of each and every component assembled in the security system.

$$\rho(S) = \rho(Ti) + \rho(Bi) + \rho(CO_i) + \rho(Ai) + \rho(Di)$$

where, i indicate the instance of the time t.

The system includes (T_i) to record the day to day activities in the specified location. T_i includes the process of recording with automated features of storing and play back of the events on the stated period of time. The components like web camera, storage capacity and user interfaces to attain flexible operation of the system. (B_i) is used in addition to traditional monitoring system to store the images of frequently accessing object in the prescribed format. Memory requirement is less because the object count is limited. The regular object precedes the normal entry after the approval from the secured automated system. The intelligent system learns by itself through the trained knowledge and decides to activate or deactivate the devices to respond to the user.

(CO_i) is used to capture the image of a presented object. To recognize the captured image, it is essential to record different focus without affecting the quality. The captured images are stored using generated identification number.

(A_i) is used to allow the admin to perform the confirmation entry to have authorized access or to reject the access. It provides confident security to the system.

(D_i) holds the entire control of the system which makes intelligent decisions based on the knowledge extracted from learning experience. It can be strengthening only by the co-ordination of electrical devices and integrated software's.

1.1 Application Framework:

The Application Framework level affords voluminous higher-level services to applications in the practice of implementing built in technical classes. The user can define the object state and behavior inside the method. It is mandatory to enable automatic invocation of the defined methods based on the emergence of real time arguments. The developers are allowable to make use of high level security services to reflect in intelligent in automated home security systems.

The framework includes the subsequent strategic services:

- **Activity Manager:** The defined tasks are organized sequentially, and proper controlling measures are stated to maintain the application lifecycle and activity stack without any loss in functionality.
- **Content Providers:** Multiple devices from different manufactures need to communicate with each other to share data with the objective of attaining effective security system.
- **Resource Manager:** Manages the access to the stated user interfaces, tools to invoke non-coded embedded resources and other library files.
- **Notifications Manager:** Permits the system to generate notifications and alarm signals to the admin.

1.2 Object Recognition using Image Processing:

Image processing is a technique to translate an image of fixed size into digital form to perform required operations on it, in command to get an enriched image. The original image will not useful to make a clear decision unless otherwise the knowledge is extracted with valid information from it. It is a type of indication privilege in which the image, video frame or photograph are acted as input and output may be processed image or properties associated with that inputted image.

It is one of the rapidly emergent technologies today, with its features. It incorporates all the aspects of a real-world business with dynamic adoption. The following step processes are implemented in (CO_i) to preserve the quality of the captured image are as follows,

- Importing the captured image
- Comparing the stored image with captured image

- a) If there is an occurrence of equality, then $S=1$ (indicate process without error).
- b) If the equality is not found, then $S=0$ (indicate the abnormality)
- Scrutinizing and employing the image which includes data compression, image enrichment and spotting patterns.
- a) Object Image Segmentation
- b) Object Image Comparison
- c) Medical diagnosis of an Object image
- Sharing and Publishing the scrutinized image to carry out the confirmation procedure to have authorized access.

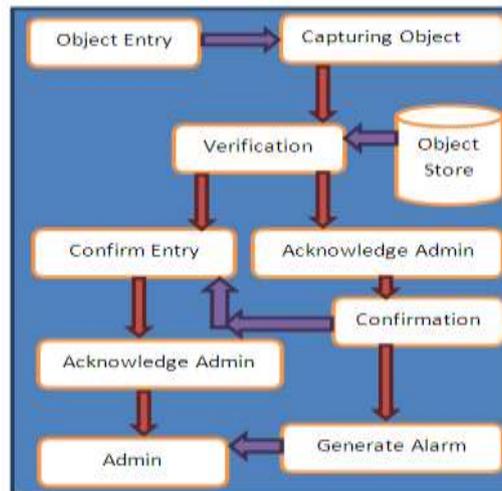


FIG: Schematic Representation of Security Model

Artificial intelligent features support to emulate the human optical system and interpret with 3D sphere from 2D imageries which includes the implementation of the following process,

- Object Recognition
- Motion Tracking
- 3D figure from several 2D images

The above figure represents the area of object recognition and impact of fulfilling the security confirmation task. The object image recognition is attained by combining the functionalities of various sub elements which are capable to assure the quality of an acquired image without any pixel loss. Such major elements are,

- a) Visualization
- b) Image Sharpening and restoration
- c) Image Retrieval
- d) Pattern Recognition
- e) Image Recognition

Visualization is the process of displaying the image in multiple forms to enrich the clarity involved in understanding. The process of visualization plays a vital role in transmitting the images between communicational devices that support in decision making process. The image processing is the way to obtaining a desired set of images for any purpose. They are used in a variation of dynamic applications to support multiple intellectual task viewed in different perspective.

Image sharpening and restoration deals with influencing the captured object images through a digital computer. It is a subfield of indications and systems but focus predominantly on the indicated images. Basically, an image has been captured by a camera and has been sent to a digital system to eliminate all the additional details, and just focus on the specific spot by zooming it in such a way that the quality of the image remains the same.

Basic categories of Image retrieval method is stated as Content based image retrieval (CBIR) and Content-based visual information retrieval (CBVIR). Content-based will search and analyzes the contents of the image rather than the metadata.

Pattern recognition is a machine learning mechanism that aims on the recognition of patterns and constancies in data. Pattern recognitions are executed with the training data and other effective algorithms are used to discover unpredicted patterns.

Image recognition is highly efficient and suitable for security surveillance systems to identify and detect an object or its feature in a digital image or transmitted form.

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III. CONCLUSION

The formulated design aspects are highly sufficient to model home security system that is highly efficient in preventing unauthorized object entry. Remote monitoring provides flexible and user-friendly applications to ensure the protection of home through accessible network. The proposed model is economically feasible to the users to deploy the system in their environment.

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